SPECIAL PROVISION FOR CRASH CUSHIONS

This Special Provision will apply when indicated on the plans or in the proposal. Section references herein are to the Department's 2004 Standard Specifications for Road and Bridge Construction.

1.0 DESCRIPTION. Furnish and install crash cushion systems of the designated types and configurations at the locations shown on the Plans, and furnish replacement items in quantities designated on the Plans. Install each type of crash cushion according to the Standard Drawings and according to the manufacturer's instructions.

2.0 MATERIALS. Conform to the most current specifications and details recommended by the manufacturer of the crash cushion designated for use, except as otherwise specified herein.

2.1 Type I. Use either Traffix Impact Attenuator Sand Barrels as developed by Traffix Devices Inc., of San Clemente, California or Energite III Sand Barrels as developed by Energy Absorption Systems, Inc., of Chicago, Illinois. Provide a sand-salt mixture consisting of 95 percent, by weight, of air dried natural sand conforming to the requirements of Subsection 804.03, and 5 percent commercial quality salt.

2.2 Type II. Use the Fitch Universal Module Crash Cushion (Fitch Sand Barrels) as developed by Roadway Safety Service of Wauconda, Illinois. Provide a sand-salt mixture consisting of 95 percent, by weight, of air dried natural sand conforming to the requirements of Subsection 804.03, and 5 percent commercial quality salt.

2.3 Type VI. Use either of the following:

(a) The QuadGuard System as developed by Energy Absorption Systems, Inc., of Chicago, Illinois. For all miscellaneous metal work conform to ASTM A 36 and hot-dip galvanize according to ASTM A 123. Hot-dip galvanize the Quad-Beam Guardrail sections and Quad-beam to W-beam connectors after fabrication according to ASTM A 123.
(b) The TRACC System as developed by Trinity Industries (Syro Steel) of Girard, Ohio. For all miscellaneous metal work conform to ASTM A 36 and hot-dip galvanize according to ASTM A 123. For the TRACC fender panels conform to AASHTO 180. Hot-dip galvanize the TRACC fender panels and TRACC-beam connectors after fabrication according to ASTM A 123.

2.4 Type VI-T. Use either of the following:

(a) The QuadGuard CZ System as developed by Energy Absorption Systems, Inc., of Chicago, Illinois, for use as a temporary crash cushion at the end of temporary concrete barriers. For all miscellaneous metal work conform to ASTM A 36 and hot-dip galvanize according to ASTM A 123. Hot-dip galvanize the Quad-Beam Guardrail sections, Quad-beam to W-beam connectors, and QuadGuard Transition Panels after fabrication according to ASTM A 123.
(b) The TRACC System as developed by Trinity Industries (Syro Steel) of Girard, Ohio. For all miscellaneous metal work conform to ASTM A 36 and hot-dip galvanize according to ASTM A 123. For the TRACC fender panels conform to AASHTO 180. Hot-dip galvanize the TRACC fender panels and TRACC-beam connectors after fabrication according to ASTM A 123.

2.5 Type VII. Use the QuadGuard System (Wide) as developed by Energy Absorption Systems, Inc., of Chicago, Illinois, for use at wide locations. For all miscellaneous metal work conform to ASTM A 36 and hot-dip galvanize according to ASTM A 123. Hot-dip galvanize the Quad-Beam Guardrail sections and end shoe after fabrication according to ASTM A 123.

2.6 Type VIII. Furnish a TMA conforming to NCHRP 350 at the appropriate test level for the project's posted speed limit. For all miscellaneous metal work conform to ASTM A 36 and hot-dip galvanize according to ASTM A 123.

2.7 Type IX. Use the Crash Cushion/Attenuating Terminal (C.A.T.) as developed by Trinity Industries (Syro Steel) of Girard, Ohio. Connect to a wall, pier, or other fixed object. For all miscellaneous metal work conform to ASTM A 36 and hot-dip galvanize according to ASTM A 123.

2.8 Type IX-A. Use the Crash Cushion/Attenuating Terminal (C.A.T.) as developed by Trinity Industries (Syro Steel) of Girard, Ohio. Connect to guardrail. For all miscellaneous metal work conform to ASTM A 36 and hot-dip galvanize according to ASTM A 123.

2.9 Concrete. Furnish AA concrete conforming to Section 601.

3.0 CONSTRUCTION. Submit to the Engineer for approval installation drawings that accurately depict all details necessary for completing the installation. Do not start work until the Engineer approves the drawings. Furnish to the Engineer items such as manufacturer's brochures or specifications that completely outline the crash cushion manufacturer's current recommendations for materials and installation methods before beginning installation. All workmanship and materials are subject to the Engineer's approval.

Furnish and install Type 1 object markers according to the Plans and Standard Drawings.

The Department may specify various components of the system on the plans or in the proposal as replacement elements. Furnish the specified quantity of replacement elements and deliver to the storage area designated in the proposal or by the Engineer.

3.1 Type I and II. When installing on concrete or asphalt surfaces, mark the location of the bottom perimeter of each primary element on the pavement surface by painting a 4-inch wide yellow line. Identify the location of each primary element by painting numerals or letters inside the perimeter line according to the schematic shown on the plans. Make the letters or numerals 12 inches in height with 3 inches wide lines forming the numerals or letters.

When placing the crash cushion system on surfaces unsuitable for painting, mark the location of each primary element of the system using a 12-inch square piece of galvanized sheet metal a minimum of 01.09-inch thick, held in place by a 1/2 inch diameter steel pin at least 12 inches long with a head of sufficient size to securely hold the sheet in place after the pin is driven. Paint 6-inch high yellow numerals or letters, as the plan schematics designate, on the sheet metal squares.

Place sand-salt mixtures in the individual cells or modules after they are in place. Thoroughly mix the sand and salt to form a homogeneous mixture prior to placing it in the cells. Place the quantity of mixture in each cell to within ± 5 percent of that shown on the Plans. After placing the sand-salt mixture in individual elements or modules, place the lids, drill holes at 4 equidistant points, and rivet in place. Thoroughly clean all spilled sand-salt mixture from the roadway surface and wash when the Engineer directs.

3.2 Type VI and VII. Install at the locations shown on the Plans or where the Engineer directs. Construct a concrete pad when the Contract requires or when the Engineer directs. Construct the pad according to Section 501 for rigid pavement or Section 505 for sidewalk, except use Class AA concrete.

3.3 Type VI-T. Install at the locations shown on the Plans or where the Engineer directs, and connect to the temporary concrete barrier according to the Plans or Standard Drawings.

Construct a concrete pad when the Contract requires or when the Engineer directs. Construct the pad according to Section 501 for rigid pavement or Section 505 for sidewalk, except use Class AA concrete.

The Plans or the Engineer may require a Crash Cushion Type VI-T to be used at more than one location on the project. When required, relocate the crash cushion at the time and in the sequence designated by the plans or by the Engineer.

Maintain and keep operative each Crash Cushion Type VI-T until its usefulness has ended. Stock at all times the necessary materials to repair a damaged crash cushion. Repair damaged crash cushion as soon as practical, not to exceed 24 hours, after the damage occurs.

After the usefulness of each Crash Cushion Type VI-T has ended, dismantle and store on the right-of-way at a site the Engineer approves.

3.4 Type VIII. Mount on a truck of the size, and in a manner, recommended by the crash cushion manufacturer. During the course of the work, deploy, operate, and maintain the truck-mounted crash cushion at locations the Engineer directs. Stock enough cells to restore one crash cushion after one impact, and repair all damaged crash cushions as soon as practicable after damage occurs. After its usefulness has ended, remove the crash cushion from the truck and store the crash cushion together with mounting hardware on the right-of-way at a site the Engineer approves. The crash cushion and mounting hardware will become the property of the Department. The Department will not take ownership of the truck.

3.5 Type IX, and IX-A. Install at the locations shown on the Plans or where the Engineer directs.

4.0 MEASUREMENT.

4.1 Crash Cushion Types I, II, VI, VII, IX, and IX-A. The Department will measure the quantity by each individual unit. When the plans or proposal specifies that the crash cushion is to be used in a temporary manner, the Department will measure as specified for Crash Cushion Type VI-T.

The Department will not measure the work necessary to anchor Crash Cushion Types VI, VI-T and VII to existing pavement or bridge decks for payment and will consider it incidental to the crash cushion.

4.2 Crash Cushion, Type VI-T. The Department will measure the quantity of Crash Cushion Type VI-T units furnished, installed, dismantled, and stored on the right-of-way.

The Department will not measure furnishing and installing the W-beam to crash cushion connectors; furnishing and installing rear unit plates and front unit plates; work or materials necessary to repair damaged crash cushions; materials kept in stock or used to repair damaged crash cushions; or dismantling the units and storing them on the right-of-way for payment and the Department will consider them incidental to the crash cushion.

4.3 Relocate Crash Cushion. The Department will measure the quantity by each unit and will consider it to include the unit's removal and re-installation at a different location.

4.4 Crash Cushion, Type VIII. The Department will measure the quantity by each unit and will consider it to include furnishing, deploying, operating, maintaining, and storing on the right-of-way.

4.5 Crash Cushion Replacement Elements. The Department will measure the quantity by the lump sum and will consider it to include all replacement elements the Contract specifies and their delivery to the designated storage area.

4.6 Concrete, Class AA (for pads). The Department will measure the quantity used for Crash Cushion Type VII in cubic yards. The Department will not measure excavation or steel reinforcement for payment and will consider it incidental to the Class AA Concrete.

The Department will not measure the quantity for payment when used for Crash Cushion Type VI or VI-T and will consider it incidental to the crash cushion bid item.

5.0 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
----	Crash Cushion, Type	Each
2898	Relocate Crash Cushion	Each
2892	Crash Cushion Replacement Elements	Lump Sum
8104	Concrete, Class AA	Cubic Yard

The Department will consider payment as full compensation for all work required in this provision.

March 1, 2004